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The occurrence of the Pear Psyllid, *Cacopsylla bidens* (Šulc, 1907) (Insecta: Hemiptera: Psyllidae), in Uruguay

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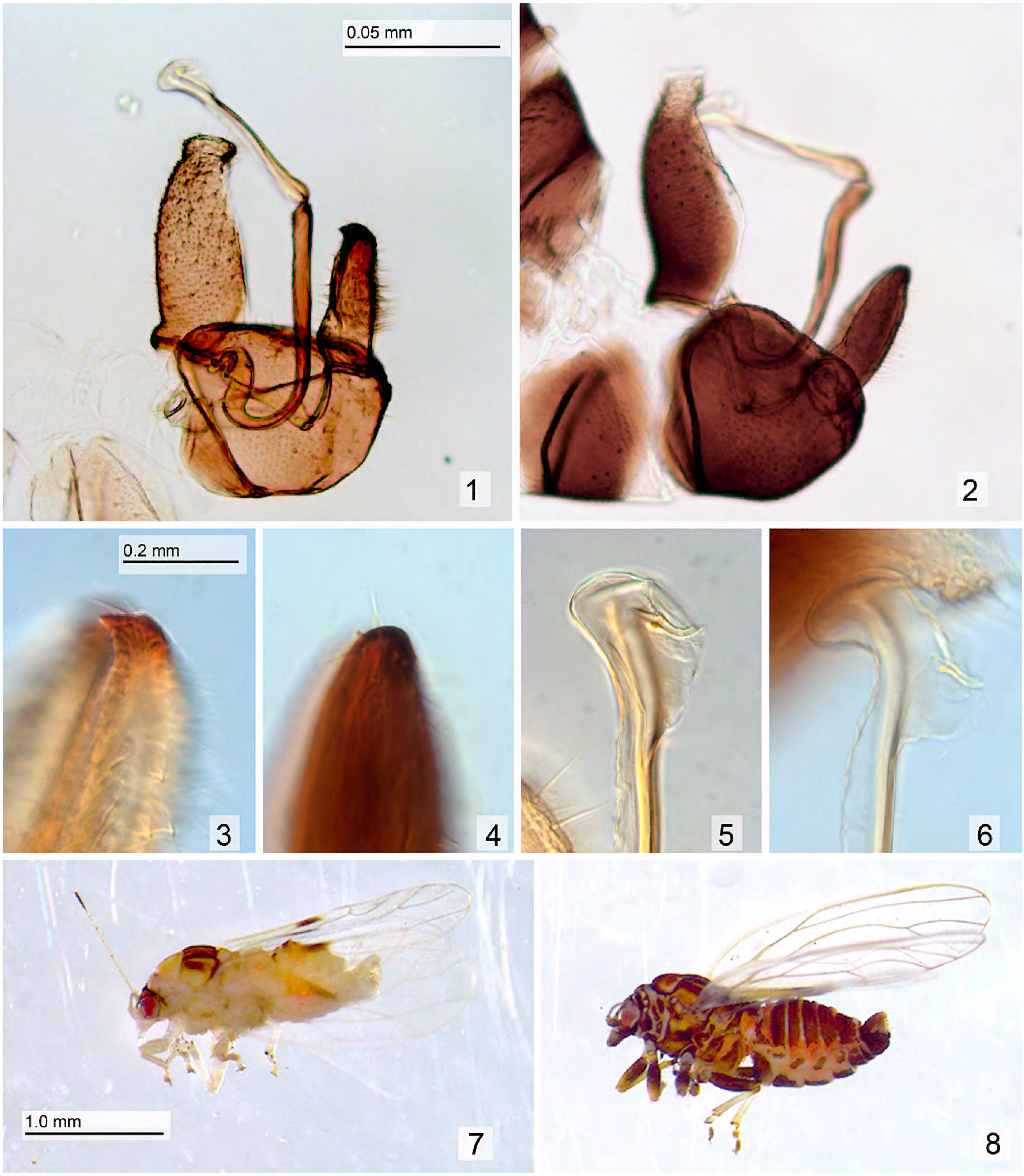
Abstract: The Pear Psyllid, *Cacopsylla bidens* (Šulc, 1907), is here reported from the Department of Canelones, the major region of pear production in Uruguay. Previous records of *C. pyricola* (Foerster, 1848) from Uruguay are misidentifications of *C. bidens*. Information is provided on the taxonomy and biology of this species.

Key words: temperate South America; misidentification; *Cacopsylla pyricola*

Psyllids are phytophagous insects with a high degree of host specificity (Burckhardt et al. 2014). A few species are important pests of crops and ornamental plants (Burckhardt 1994a). Some of the most important pests of pear are psyllids belonging to *Cacopsylla* (Psyllidae: Psyllinae). This is a large, poorly defined and probably artificial genus with over 450 described species developing on a wide range of host families of eudicots (Ouvrard 2017). Around 40 *Cacopsylla* species are associated with *Pyrus* species (Yang et al. 2004; Li & Yang 1984; Hodkinson 1984; Burckhardt & Hodkinson 1986; Burckhardt 1994a; Luo et al. 2012). The damage caused to pear by psyllids can be direct by the excessive removal of plant sap and, thus, weakening of the plants. More important, however, are the indirect effects of psyllids. Firstly, honeydew, mostly secreted by the immatures, soils the fruits and provides a substrate for the growth of sooty mold which impedes photosynthesis (Burckhardt 1994a; Horton 1999). Secondly, pear psyllids are also vectors of the bacterium *Candidatus* Phytoplasma pyri, the causal agent of the serious plant disease, pear decline (Seemüller & Schneider 2004). Pear psyllids originate from the Palaearctic. One species, *Cacopsylla pyricola* (Foerster, 1848), was introduced into North America around 1833 and is today widely distributed in Canada and the United States where its host is planted (Hodkinson 1984). In South America, pear psyllids were probably introduced in the 20th century. The oldest record is from Uruguay (Trujillo 1942), followed by records from Argentina (Quintanilla 1955; Hodkinson & White 1981), attributed to the 'psílido de peral' or to '*Psylla*' *pyricola*). Burckhardt & Hodkinson (1986) revised the west Palaearctic pear psyllids and separated *Cacopsylla bidens* (Šulc, 1907) from *C. pyricola*. Hodkinson (1989) showed that the records of the latter from Argentina and Chile were misidentifications of *C. bidens*. Recent reports on pear psyllids from Uruguay (Betancourt & Scatoni 2010; Betancourt et al. 2009) refer to *Cacopsylla pyricola*. As virtually nothing is known about the way of introduction of pear psyllids into South America and multiple introductions of different species are possible, a study was conducted to examine the identity of pear psyllids present in Uruguay.

Material for this study was collected in a Williams pear orchard, located in the Department of Canelones (34°40′11.24″ S, 056°20′20.43″ W), the region where most of Uruguay's pear production is concentrated. The sampling was done weekly between December and April and between June and August, during three years (2012–2015) using a Souplan Pro aspirator (Horton 1999). The psyllids were identified using the key of Burckhardt & Hodkinson (1986). The identity of selected samples was verified by Daniel Burckhardt. Voucher specimens are deposited in the Entomology Collection of the Faculty of Sciences of the National University of Uruguay and in the collection of the Naturhistorisches Museum Basel, Switzerland (NMB) (NMB-PSYLL0004366 – NMB-PSYLL0004378). From the latter collection we examined following additional specimens: *Cacopsylla bidens*: Afghanistan, Argentina, Armenia, Bulgaria, Chile, India, Iran, Israel, Italy, Lebanon, Romania, Slovakia, Turkey, and Ukraine; *C. pyricola*: Austria, Bulgaria, France, Germany, Greece, Switzerland, and the United Kingdom.

Cacopsylla bidens differs from *C. pyricola* in the form of the paramere (Figures 1–4), the apex of the aedeagus (Figures 5, 6) and, to a lesser extent in the shape of the



Figures 1–8. Pear psyllids of the genus *Cacopsylla*. **1, 3, 5, 7, 8:** *Cacopsylla bidens* (Šulc, 1907); **2, 4, 6:** *Cacopsylla pyricola* (Foerster, 1848). — **1, 2:** Male terminalia in lateral view (scale bar Fig. 1); **3, 4:** apical portion of paramere (scale bar Fig. 3); **5, 6:** apical dilatation of distal portion of aedeagus (scale bar in Fig. 5); **7:** summer form; **8:** winter form (scale bar in Fig. 7).

genal processes and female terminalia (Table 1). The immatures of the two species are similar and no stable characters are known to separate them. The paramere of *C. bidens* (Figure 1) is, in lateral view, slightly shorter and thicker than that of *C. pyricola* (Figure 2), and bears two characteristic teeth apically (Figure 3), rather than being rounded as in *C. pyricola* (Figure 4). The distal segment of the aedeagus of *C. bidens* (Figure 5) has a weakly curved and wide apical dilatation, rather than a strongly curved, narrow apical dilatation as in *C. pyricola* (Figure 6). *Cacopsylla bidens*, like its close relatives *C. pyri* (Linnaeus, 1758), *C. pyricola*, etc., is seasonally dimorphic (Burck-

Table 1. Diagnostic characters separating *Cacopsylla bidens* (Šulc, 1907) and *C. pyricola* (Foester, 1848).

Structure	*Cacopsylla bidens*	*Cacopsylla pyricola*
Genal processes	Blunt	Subacute
Parameres	Stout, robust (fig. 1), with two small apical teeth (fig. 3)	Lamellar (Fig. 2), apex blunt (Fig. 4)
Apical dilatation of distal portion of aedeagus	Thick, weakly curved (Fig. 5)	Slender, strongly curved (Fig. 6)
Female proctiger	Relatively thickset	Relatively slender

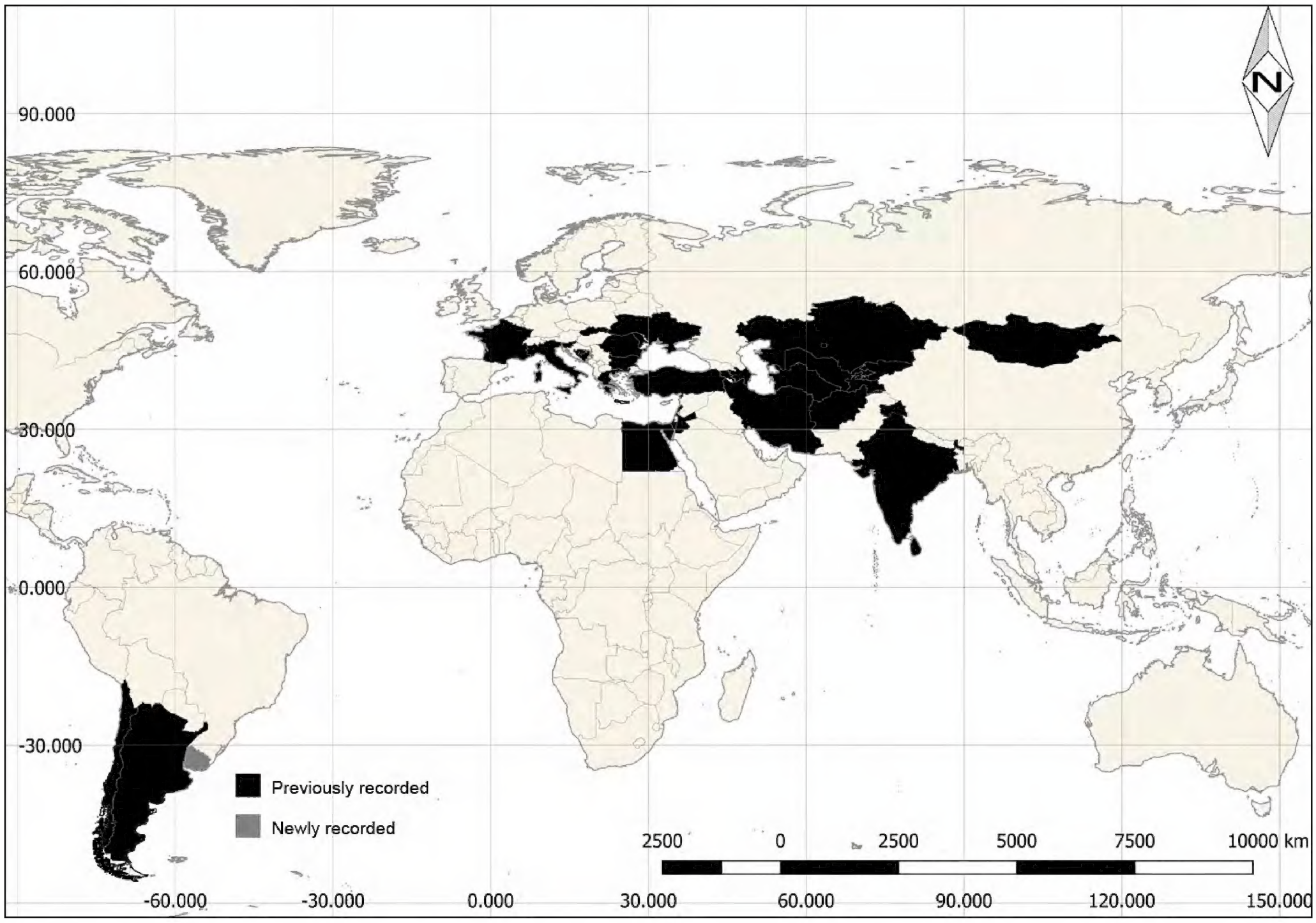


Figure 9. Distribution map of *Cacopsylla bidens*.

hardt & Hodkinson 1986). Adults of the winter form appear in Uruguay in the months between May and August (Figure 8). They are larger, dark coloured, lack surface spinules in the apical part of the forewing and display a reproductive diapause. Specimens of the summer form appear in Uruguay between September and April (Figure 7). They are smaller, light coloured and possess surface spinules in all cells of the forewing. The regulation of the polymorphism is influenced by both temperature and photoperiod (Soroker 2013).

Cacopsylla bidens is widely distributed in Central and Southern Europe, the Mediterranean region, the Middle East and Central Asia. It was reported from Armenia, Azerbajan, Bosnia and Herzegovina, Bulgaria, Egypt, France, Greece, Iran, Israel, Italy, Jordan, Kazakhstan, Kyrgyzstan, Lebanon, Moldova, Mongolia, Romania, Slovakia, Slovenia, Tadzhikistan, Turkey, Turkmenistan, Ukraine, Uzbekistan and, as introduction, from Argentina and Chile (Figure 9) (Lauterer 1979; Burckhardt & Hodkinson 1986; Hodkinson 1989; Gegechkori & Loginova 1990; Burckhardt 1994b; Chireceanu 2007; Etropolska et al. 2015; Ouvrard 2017). It occurs also in Afghanistan und India (NMB data). Here, we document the presence of *C. bidens* in Uruguay and suggest that previous records of *C. pyricola* from this country (Truijillo 1942; Betancourt & Scatoni 2010; Betancourt et al. 2009) are misidentifications of *C. bidens*. The latter is distributed throughout the pear production area in Uruguay. In the country, the phytoplasma was detected in the plants (Maeso 2012) but not yet in the psyllids. Additional work is required to confirm that *C. bidens* is the vector.

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